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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,289	01/14/2005	Hubrecht Lambertus Tjalling De Blick	NL 020623	8513

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P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER	
BROOME, SAID A	

ART UNIT	PAPER NUMBER
2628	

MAIL DATE	DELIVERY MODE
09/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/521,289	DE BLIEK, HUBRECHT LAMBERTUS TJALLING
	Examiner	Art Unit
	Said Broome	2628

-- ***The MAILING DATE of this communication appears on the cover sheet with the correspondence address*** --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,6,7 and 9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6,7 and 9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action is in response to an amendment filed on 6/18/2007.
2. Claims 1, 3, 4 and 9 have been amended.
3. Claims 2, 6 and 7 are original.
4. Claims 5 and 8 have been cancelled.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 6, 7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gering ("*A System for Surgical Planning and Guidance using Image Fusion and Interventional MR*") in view of Burke et al.(hereinafter "Burke", US Patent 6,421,454).

Regarding claims 1 and 9, Gering teaches a method of producing and displaying an image on a display screen of a volume from a multi-dimensional object data set (section 1.2.1 1st ¶ lines 3-8: "*The 3D Slicer provides an end-to-end solution that bundles different aspects of analysis into a single visualization…3D computer models of key structures such as skin, brain vessels, tumor, and motor cortex can be generated and visualized in a 3D scene…*", and Figure 1-3). Gering also teaches a computer system (section 2.2 page 32 lines 1-2: "*We operate the 3D Slicer on PCs running Windows and Sun workstations…*", Figure 2-13) that performs the

processing of the image graphics data, as recited in claim 9. Gering also teaches a surface associated with the volume is identified and an initial position on the identified surface is selected (section 1.2.1 1st ¶ lines 3-4: "*A yellow sphere is placed on the skin model at the entry point under investigation.*"), where the user identifies a certain region of the surface and selects an initial position on the surface (Figure 3-2). Gering also teaches at least one depth associated with the identified surface is selected and a reformat slice is produced from the object data set at a selected depth along the normal to the identified surface at the selected initial position (page 20 1st ¶ lines 6-10: "*The surface models can then be visualized in the 3D view along with the reformatted slices... slices can selectively clip away portions of some models, such as the skin, to reveal other unclipped models beneath...Distances, angles, surface areas, and volumes of structures can be measured quantitatively.*" and in section 3.2 1st ¶ lines 1-7: "*... neurosurgical planning is plotting an approach trajectory...The 3D Slicer facilitates trajectory planning...with the click of a button, the 3D view is set to align the viewing angle along the two points - from entry to target. The three reformatted planes become oriented relative to this trajectory.*"), where the volume data is clipped away based on a certain depth normal relative to the surface chosen by the user (Figure 3-2). Gering illustrates a resulting image displayed on a display screen (Figure 3-2), and that a plurality of subsequent positions on the identified surface are sequentially selected by moving a cursor on the display screen over the resulting image (section 3.6 lines 4-5: "*The ability to quickly align the reformatted slices along various approach trajectories enables investigation, and a form of simulation...*"), where several paths may be defined for the volumetric data, therefore subsequent positions may be selected on the identified surface by a user moving a yellow cursor on the screen (Figure 3-2), where the subsequent

selection of positions creates reformatted images relative to the position (section 3.2 1st ¶ lines 1-7: "*... neurosurgical planning is plotting an approach trajectory...The 3D Slicer facilitates trajectory planning...with the click of a button, the 3D view is set to align the viewing angle along the two points - from entry to target. The three reformatted planes become oriented relative to this trajectory.*"). Gering teaches an object is thereby displayed from a plurality of angles in three dimensions (section 2.5 2nd ¶ lines 1-2: "*The 3D Slicer supports rigid, manual registration by allowing the user to specify which volume to move, and then translate and rotate that data set by clicking...*", section 1.3.1 3rd ¶ lines 2-4: "*Effects...can be applied to the data on a 3D or slice-by-slice basis while being visualized interactively in 3D.*" and Figure 2-6). However, Gering fails to teach a depth associated with the surface selected from a priori information. Burke teaches a depth associated with the surface selected from a priori information (column 11 lines 22-25: "*...an embodiment of the invention which locates the depth of solid features of interest. Such features are preferably user selected...*" and column 11 lines 51-53: "*The plane with...the feature of interest and its associated depth Z_n are stored in memory...*"), where planes contain an associated stored depth, therefore a selected plane contains a predetermined stored depth. It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Gering with Burke because this combination would provide a reduction in computer processing through enabling a user to select a slice of a region of interest within a volume where the selection of the slice is determined using predetermined information regarding the specific structure within the volume, thereby excluding undesired slices from the user's view.

Regarding claim 2, Gering teaches at least one further position on the identified surface is selected (section 3.6 lines 4-5: "*The ability to quickly align the reformatted slices along various approach trajectories enables investigation...*"), where it is described that several positions for a trajectory may be defined, therefore subsequent multiple positions may be selected on the identified volumetric surface by a user. Gering also teaches a reformat slice is produced at said selected depth along the normal to the identified surface at said further selected position (section 3.2 1st ¶ lines 1-7: "*...neurosurgical planning is plotting an approach trajectory...The 3D Slicer facilitates trajectory planning...with the click of a button, the 3D view is set to align the viewing angle along the two points - from entry to target...reformatted planes become oriented relative to this trajectory.*", and in Figures 2-11 and 3-2).

Regarding claim 3, Gering teaches a method of producing and displaying an image on a display screen of a volume from a multi-dimensional object data set (section 1.2.1 1st ¶ lines 3-8: "*The 3D Slicer provides an end-to-end solution that bundles different aspects of analysis into a single visualization...3D computer models of key structures such as skin, brain vessels, tumor, and motor cortex can be generated and visualized in a 3D scene...*", and in Figure 1-3). Gering teaches a surface associated with the volume is identified and an initial position on the identified surface is selected (section 1.2.1 1st ¶ lines 3-4: "*A yellow sphere is placed on the skin model at the entry point under investigation.*"), where that the user identifies a certain region of the surface and selects an initial position on the surface (Figure 3-2). Gering also teaches at least one depth associated with the identified surface is selected and a reformat slice is produced from the object data set at a selected depth along the normal to the identified surface at the selected initial position (page 20 1st ¶ lines 6-10: "*The surface models can then be visualized in the 3D*

view along with the reformatted slices, and the slices can selectively clip away portions of some models, such as the skin, to reveal other unclipped models beneath...Distances, angles, surface areas, and volumes of structures can be measured quantitatively." and in section 3.2 1st ¶ lines 1-7: "... *neurosurgical planning is plotting an approach trajectory...The 3D Slicer facilitates trajectory planning...with the click of a button, the 3D view is set to align the viewing angle along the two points - from entry to target. The three reformatted planes become oriented relative to this trajectory.*"), where the volume data is clipped away based on a certain depth normal relative to the surface chosen by the user (Figure 3-2). Gering illustrates a resulting image displayed on a display screen (Figure 2-11), and shows reformat slices are produced perpendicular to the normal to the identified surface at the selected position (Figure 3-2). Gering teaches that a plurality of subsequent positions on the identified surface are sequentially selected by moving a cursor on the display screen over the resulting image (section 3.6 lines 4-5: "*The ability to quickly align the reformatted slices along various approach trajectories enables investigation, and a form of simulation...*"), where several paths may be defined for the volumetric data, therefore subsequent positions may be selected on the identified surface by a user moving a yellow cursor on the screen (Figure 3-2), where the subsequent selection of positions creates reformatted images relative to the position (section 3.2 1st ¶ lines 1-7: "*...neurosurgical planning is plotting an approach trajectory...The 3D Slicer facilitates trajectory planning...with the click of a button, the 3D view is set to align the viewing angle along the two points - from entry to target. The three reformatted planes become oriented relative to this trajectory.*"). Gering also teaches an object is thereby displayed from a plurality of angles in three dimensions (section 2.5 2nd ¶ lines 1-2: "*The 3D Slicer supports rigid, manual*

registration by allowing the user to specify which volume to move, and then translate and rotate that data set by clicking...", section 1.3.1 3rd ¶ lines 2-4: "*Effects...can be applied to the data on a 3D or slice-by-slice basis while being visualized interactively in 3D.*" and Figure 2-6). However, Gering fails to teach that the depth associated with the identified surface is selected by selecting one of the reformat slices. Burke teaches the depth associated with the identified surface is selected by selecting one of the reformat slices (column 11 lines 34-40: "*The image processor 14 then selects (step 134) a planar slice at depth Z_n from the three dimensional ultrasound data...*"), where the slice is selected at a certain associated depth. It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Gering with Burke because this combination would provide a slice of region of interest within a volume cut from a position chosen by the user, as taught by Gering in section 3.2 1st ¶ lines 1-7, where processing time is reduced through determining depth based on the selection of a certain slice of interest without requiring prior depth data, as taught by Burke in column 11 lines 22-25–34-35.

Regarding claim 6, Gering teaches the reformat slice is perpendicular to the normal to the identified surface at the selected point on the identified surface, at the point on the reformat slice where the reformat slice is intersected by said normal to the identified surface (section 3.2 1st ¶ lines 1-7: "*...neurosurgical planning is plotting an approach trajectory...The 3D Slicer facilitates trajectory planning...with the click of a button, the 3D view is set to align the viewing angle along the two points - from entry to target...reformatted planes become oriented relative to this trajectory.*"), where slices are relative to the trajectory path to identified surface specified by the user (Figure 3-2).

Regarding claim 7, Gering teaches a reformat slice, which is a slice produced from the three-dimensional image at a certain depth (section 3.2 1st ¶ lines 1-7: "*...The 3D Slicer facilitates trajectory planning...with the click of a button, the 3D view is set to align the viewing angle along the two points - from entry to target...reformatted planes become oriented relative to this trajectory.*" and on page 20 1st ¶ lines 6-10: "*The surface models can then be visualized in the 3D view...and the slices can selectively clip away portions of some models, such as the skin, to reveal other unclipped models beneath...Distances, angles, surface areas, and volumes of structures can be measured quantitatively.*"), and is produced from a stack of reformat slices (section 2.3.1 3rd ¶ lines 1-3: "*Volume data is stored as a stack of 2D images as displayed in Figure 2-3. The 3D Slicer enables one to better visualize volume data through Multi-Plane Reformatting (MPR). A reformatted image is derived by arbitrarily orienting a plane in 3D space...*"), therefore the reformat slices are stacked to form the 3D data and are cut relative toe the desired depth (Figures 2-11 and 3-2).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gering in view of Yanof et al.(hereinafter "Yanof", US Patent 5,371,778).

Regarding claim 4, Gering teaches a method of producing and displaying an image on a display screen of a volume from a multi-dimensional object data set (section 1.2.1 1st ¶ lines 3-8: "*The 3D Slicer provides an end-to-end solution that bundles different aspects of analysis into a single visualization...3D computer models of key structures such as skin, brain vessels, tumor, and motor cortex can be generated and visualized in a 3D scene...*", and is shown in Figure 1-3). Gering teaches a surface associated with the volume is identified and an initial position on the

identified surface is selected (section 1.2.1 1st ¶ lines 3-4: "*A yellow sphere is placed on the skin model at the entry point under investigation.*"), where it is described that the user identifies a certain region of the surface and selects an initial position on the surface (Figure 3-2). Gering also teaches at least one depth associated with the identified surface is selected and a reformat slice is produced from the object data set at a selected depth along the normal to the identified surface at the selected initial position (page 20 1st ¶ lines 6-10: "*The surface models can then be visualized in the 3D view along with the reformatted slices, and the slices can selectively clip away portions of some models, such as the skin, to reveal other unclipped models beneath...Distances, angles, surface areas, and volumes of structures can be measured quantitatively.*" and in section 3.2 1st ¶ lines 1-7: "*... neurosurgical planning is plotting an approach trajectory...The 3D Slicer facilitates trajectory planning...with the click of a button, the 3D view is set to align the viewing angle along the two points - from entry to target. The three reformatted planes become oriented relative to this trajectory.*"), where the volume data is clipped away based on a certain depth normal relative to the surface chosen by the user (Figure 3-2). Gering illustrates a resulting image displayed on a display screen (Figure 2-11), and shows reformat slices are produced perpendicular to the normal to the identified surface at the selected position (Figure 3-2). Gering teaches that a plurality of subsequent positions on the identified surface are sequentially selected by moving a cursor on the display screen over the resulting image (section 3.6 lines 4-5: "*The ability to quickly align the reformatted slices along various approach trajectories enables investigation, and a form of simulation...*"), where several paths may be defined for the volumetric data, therefore subsequent positions may be selected on the identified surface by a user moving a yellow cursor on the screen (Figure 3-2), where the

subsequent selection of positions creates reformatted images relative to the position (section 3.2 1st ¶ lines 1-7: "*A key component of neurosurgical planning is plotting an approach trajectory...The 3D Slicer facilitates trajectory planning...with the click of a button, the 3D view is set to align the viewing angle along the two points - from entry to target. The three reformatted planes become oriented relative to this trajectory.*"). Gering also teaches an object is thereby displayed from a plurality of angles in three dimensions (section 2.5 2nd ¶ lines 1-2: "*The 3D Slicer supports rigid, manual registration by allowing the user to specify which volume to move, and then translate and rotate that data set by clicking...*", section 1.3.1 3rd ¶ lines 2-4: "*Effects...can be applied to the data on a 3D or slice-by-slice basis while being visualized interactively in 3D.*" and Figure 2-6). However, Gering fails to teach a depth associated with a created transverse view. Yanof describes a transverse view, which includes the identified surface and the selected point (column 4 lines 53-58: "*...A second view port 32 displays the data along the transverse plane 10 through the position of the cursor...the displayed (x,y) plane is selected by adjusting the selected distance along the z-axis.*"), where a transverse view is established which includes the identified surface and selected point at a certain depth (column 5 lines 26-49: "*...the operator may define cutting planes, either parallel to one of the transverse, coronal, or sagittal planes, or oblique cutting planes...the projection image can be edited for tissue type to "peel away" selected tissue types, thereby providing a new surface for the cursor to traverse...the projection image can be edited for tissue type to "peel away" selected tissue types, thereby providing a new surface for the cursor to traverse.*"). It would have been obvious to one of ordinary skill in the art at the time of invention to combine the teachings of Gering with Yanof because this combination would provide efficient user selection of a slice of a specific area of

interest within a volume, as taught by Gering in section 2.4.3 1st ¶ lines 3-4, where selection would be based on a region of interest within the slice, as taught by Yanof in column 5 lines 46-49, thereby excluding undesired areas within the volume.

Response to Arguments

Applicant's arguments filed 6/18/2007 have been fully considered but they are not persuasive.

The 35 U.S.C. 112 rejection of claim 8 has been withdrawn.

The applicant argues that the references Gering in view of Burke used in the 35 U.S.C. 103(a) rejection of claims 1, 3, 4 and 9 do not teach an object displayed from a plurality of angles in three dimensions. However, Gering teaches an object is displayed from a plurality of angles in three dimensions (section 2.5 2nd ¶ lines 1-2: "*The 3D Slicer supports...manual registration by allowing the user to specify which volume to move, and then translate and rotate that data set by clicking...*" and is shown in Figures 2-4 and 2-6).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Said Broome whose telephone number is (571)272-2931. The examiner can normally be reached on M-F 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571)272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Said Broome/
Art Unit 2628
8/13/07

U Chauhan
ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER